DETAILED ACTION

1. This is a first action on the merits of the application.

2. Claims 1 through 46 are pending.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/EP05/01223, filed February 4, 2005, which claims priority to Italian Patent Application MI2004A000299 filed on February 23, 2004.

Claim Objections

4. A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

5. Claims 5, 7, 14, and 15 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 5, which is dependent upon claim 4, recites multiple catalytic compositions, whereas claim 4 recites a single catalytic composition. Likewise, claims 7 and 15, which are both dependent upon claim 6, recite multiple catalytic compositions, whereas claim 6 recites

a single catalytic composition. Similarly, claim 14, which is dependent upon claim 13 recites multiple catalytic compositions, whereas claim 13 recites a single catalytic composition.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 40 and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Hass (U.S. 3,458,299), hereinafter, HASS.

8. In regard to claim 40, HASS discloses catalytic compositions comprising (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, and metals of group VIII (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt) (column 5, lines 1-4), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 4, lines 37-39). The set of elements useful in the process of HASS are limited to Groups VI, VII, and VIII and excludes lanthanides. Therefore, HASS excludes catalytic compositions comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B. Thus all of the features of claim 40 are anticipated by HASS.

9. In regard to claim 42, HASS discloses a process for preparing the catalytic composition according to claim 40, which comprises treating the zeolite with a compound of the element Me by means of with ion exchange or impregnation (col. 5, lines 14-15), drying (col. 5, line 22) and calcining (col. 5, lines 24-25). Thus all of the features of claim 42 are anticipated by HASS.

10. Claim 46 is rejected under 35 U.S.C. 102(b) as being anticipated by Ward (U.S. 4,584,287), hereinafter, WARD.

11. WARD discloses a catalytic composition consisting of (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, mixed with one or more metals of group VIII (col. 7, lines 37-42), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 5, lines 1-4), and (c) one or more lanthanides (col. 5, lines 20-24). Thus all of the features of claim 46 are anticipated by WARD.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. Claims 1-5, 9-14, 16-20, and 25-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hass (U.S. 3,458,299), hereinafter, HASS, in view of Yoshimura, et. al, (U.S. 6,498,279), hereinafter YOSHIMURA, as evidenced by Barker, et. al, ("Petroleum" in The Kirk-Othmer Encyclopedia of Chemical Technology, John Wiley & Sons, 2005), hereinafter BARKER, and Speight, ("Petroleum (Refinery Processes)" in The Kirk-Othmer Encyclopedia of Chemical Technology, John Wiley & Sons, 1996), hereinafter SPEIGHT.

15. With regard to claim 1, HASS discloses a process for the production of linear alkanes containing less than 6 carbon atoms (col. 1, line 12) which comprise contacting a mixture comprising one or more hydrocarbons containing at least 6 carbon atoms (col. 1, line 13) in presence of hydrogen (col. 1, line 15) with a catalytic composition comprising (a) at least one element selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, and metals of group VIII (column 5, lines 1-4) and (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 4, lines 37-39).

16. HASS does not appear to explicitly disclose the exclusion of a catalytic composition comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total

substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B when the mixture treated is a mixture containing aromatic compounds.

17. However, YOSHIMURA discloses a catalytic composition comprising at least one lanthanide (col. 2, lines 49-53), at least one metal belonging to group VIII (col. 2, lines 64-65) and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 2, lines 38-42). YOSHIMURA discloses that the catalyst composition is used to treat a mixture containing aromatic compounds (col. 1, lines 10-12). YOSHIMURA discloses that the catalytic composition is useful for hydrogenating aromatics and mixtures containing aromatics to the corresponding paraffinic or cycloparaffinic compounds (col. 1, lines 65-67).

18. Thus, at the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the process of HASS for the production of linear alkanes containing less than 6 carbon atoms to exclude the hydrogenation catalytic composition of YOSHIMURA in order to hydrocrack the aromatics to linear alkanes, which are a valuable feedstock for steam cracking to ethylene and propylene (SPEIGHT, p. 464, Fig. 11) rather than hydrogenating them.

19. In regard to Claim 2, HASS discloses that the feedstock for the process may be any mineral oil fraction boiling between about 120°F to 650°F (col. 2, lines 17-23). It is well known in the art that such mixtures comprise one or more hydrocarbons containing at least 6 carbon atoms including aromatic compounds, open-chain alkanes, alkanes with cyclic structures, alkenes having one or more unsaturations with open chains, and

alkenes with cyclic structures having one or more unsaturation (Figures 4, 5, and 6 of BARKER).

20. In regard to claim 28, it is well known in the art that the mixtures containing aromatic compounds are fractions coming from thermal or catalytic conversion plants, or mineral oil fractions (Fig. 1 of SPEIGHT and Figure 4 of BARKER).

21. In regard to claim 32, it is well known in the art that the mixtures comprise heavy fractions coming from fuel oil from steam cracking (FOK) or Light Cycle Oil (LCO) from fluid bed catalytic cracking, previously treated to remove the asphaltenes (SPEIGHT, p. 445 and Table 2). It is well known in the art to treat refinery streams to remove asphaltenes in order to minimize coke formation during steam cracking or catalytic cracking (SPEIGHT, p. 439).

22. In regard to claim 29, it is well known in the art that the fractions may be pyrolysis gasolines, fractions coming from pyrolysis gasolines or residual fractions coming from production plants of aromatic compounds and reforming (Fig. 1 and Table 2 of SPEIGHT).

23. In regard to claim 31, it is well known in the art that the fractions may be mixed with heavy fractions coming from fuel oil from steam cracking (FOK) or Light Cycle Oil (LCO) from fluid bed catalytic cracking (SPEIGHT, p. 445 and Table 2).

24. In regard to Claim 30, it is well known in the art that the aromatic compounds in the mixtures of claim 2 comprise toluene, ethyl benzene, xylenes, benzene, C9 aromatic compounds, derivatives of naphthalene and their mixtures (Figures 5 and 6 of BARKER).

25. In regard to Claim 3, HASS discloses that the feedstock for the process may be any mineral oil fraction boiling between about 120°F to 650°F (col. 2, lines 17-23). It is well known in the art that such mixtures comprise open-chain alkanes, alkanes with cyclic structures, open-chain alkenes having one or more unsaturations and alkenes with cyclic structures having one or more unsaturations (Figures 4, 5 and 6 of BARKER).

26. In regard to Claim 27, it is well known in the art that the alkanes, alkenes or mixtures thereof are mineral oil fractions, or derive from the hydrogenation of mineral oil fractions, or from the hydrogenation of fractions from conversion plants (Figures 4, 5 and 6 of BARKER).

27. In regard to claim 4, HASS in view of YOSIMURA discloses contacting the mixture which contains aromatic compounds, as discussed in claim 2, with a catalytic composition comprising (a) at least one element selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, and metals of group VIII and (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B, with the exclusion of a catalytic composition comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B.

28. In regard to claim 5, HASS in view of YOSIMURA discloses contacting the mixture which contains aromatic compounds, as discussed in claim 4, with a catalytic

composition comprising (a) at least one element selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, and metals of group VIII and (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B, with the exclusion of a catalytic composition comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B.

29. HASS also discloses that the mixtures containing aromatic compounds may be contacted with catalytic compositions essentially consisting of (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, metals of group VIII and (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B.

30. In regard to claim-9, HASS discloses that the zeolite is a Y-zeolite (col. 4, lines 37-39).

31. In regard to claim 10, HASS discloses that the zeolite may be partially in acidic form (col. 4, lines 60-64).

32. In regard to claims 11-12, HASS discloses that the molar ratio SiO_2/Al_2O_3 in the zeolite ranges from 3 to 400 (col. 4, line 28). Furthermore, HASS discloses that the molar ratio between silicon oxide and aluminum oxide is from 5 to 50 (col. 4, line 28).

33. In regard to claims 13-14, HASS discloses that the element Me is selected from the group consisting essentially of Pt, Pd, Ti, Zn, Mo, Cu, Ni, Zn/Mo, Cu/Zn, Pd/Ti and Ni/Mo (col. 5, lines 1-9). In particular, HASS discloses the use of Pt, Pd, Ni, and Mo and combinations thereof. Thus, HASS discloses that the catalytic composition contains Y-zeolite and Pd, Y-zeolite and Pt, Y-zeolite and Ni, Y-zeolite and Zn, Y-zeolite and Mo, Y-zeolite and Zn together with Mo, Y-zeolite and Zn together with Cu, Y-zeolite and Pd together with Ti, Y-zeolite and Mo together with Ni.

34. In regard to claim 16, HASS discloses that the element Me is present in the catalytic composition in the form of an oxide, ion, metal or a mixture of these forms (col. 5, lines 18-20).

35. In regard to claims 17-18, HASS discloses that the metals present in the catalytic composition, Zn, Mo, Cu, Ga, In, W, Ta, Zr or Ti, are in a quantity varying from 0.1 to 50% by weight with respect to the total weight of the catalytic composition (col. 5, lines 10-12).

36. In regard to claims 19-20, HASS discloses that the metal belonging to group VIII (the group of noble metals) is in a quantity ranging from 0.001 to 10%, by weight (col. 5, lines 12-14).

37. In regard to claims 25-26, HASS discloses that the catalytic composition contains a binder (col. 5, line 22) and that the binder was selected from the group consisting essentially of silica, alumina, clay (col. 5, line 45).

38. In regard to claims 33-34, HASS discloses that the resulting fraction of n-alkanes are selected from the group consisting essentially of ethane, propane, n-butane and n-

pentane (col. 1, line 23) and that the fraction of n-alkanes containing from 2 to 5 carbon atoms comprises from 50 to 90% by weight of the resulting product (col. 7, lines 10-14).

39. In regard to claim 35, HASS discloses that the process is carried out in the presence of hydrogen at a pressure ranging from 5 to 200 bar (57.8 psig – 2885 psig) at a temperature ranging from 200°C to 700°C (392°F – 1292°F) (col. 1, lines 18-23).

40. In regard to claim 36, HASS discloses that the is carried out in the presence of hydrogen at a pressure ranging from 25 to 100 bar (348 psig – 1435 psig), at a temperature ranging from 300°C to 600°C (572°F – 1112°F) (col. 1, lines 18-23).

41. In regard to claims 37-38, HASS discloses that the process is carried out at a weight ratio of H_2/charge ranging from 0.1 to 1.4 or a weight ratio of H_2/charge ranging from 0.1 to 0.7 (col. 3, lines 20-23). The ratios in Table 1 of HASS can be converted to weight ratios using data on page16 of BARKER. Using this data one may calculate that the weight of a barrel ranges from 158.8 kg (for 10° API gravity) to 117.3 kg (for 60° API gravity). The weight of H_2 in Table 1 of HASS ranges from 28.1 kg (500 SCF) to 382.9 kg (15,000 SCF). Thus the weight ratios of H_2/charge in HASS range from 0.08 to 3.26.

42. In regard to claim 39, HASS discloses a process wherein a paraffin is used as a diluent (col. 2, lines 17-23). HASS discloses that the feedstock for the process may be any mineral oil fraction boiling between about 120°F to 650°F. It is well known in the art (Figure 4 of BARKER) that such mixtures comprise open-chain alkanes (paraffins) which are, therefore, diluents for the process.

44. Claims 6-8, 15, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over HASS as applied to claim 1 above, in view of YOSHIMURA, and

further in view of Ward (U.S. 4,584,287), hereinafter WARD, as evidenced by BARKER, SPEIGHT, and Kelley, et. al. (U.S. 4,040,944), hereinafter KELLEY.

45. In regard to claim 6, HASS in view of YOSHIMURA, as discussed in claim 1, discloses a process for the production of linear alkanes containing less than 6 carbon atoms which comprises contacting a mixture comprising one or more hydrocarbons containing at least 6 carbon atoms in presence of hydrogen in contact with a catalytic composition wherein the catalytic composition comprises: (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, and metals of group VIII (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt) (column 5, lines 1-4) and (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B with the exclusion of a catalytic composition comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B when the mixture treated is a mixture containing aromatic compounds.

46. HASS does not appear to explicitly disclose a catalytic composition comprising one or more lanthanides.

47. However, WARD discloses catalytic compositions comprising (a) at least one element selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti and metals of group VIII (col. 7, lines 38-42), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or

total substitution of the aluminum with Fe, Ga or B (col. 5, lines 1-4), and (c) one or more lanthanides (col. 5, lines 20-29). The catalytic compositions are useful in catalytic hydrocracking processes (col. 1, lines 13-14).

48. Therefore, at the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the process of HASS to include the catalytic composition containing the lanthanides of WARD in order to maintain catalyst activity at high temperature and during catalyst regeneration (WARD, col. 3, lines 49-52).

49. In regard to claim 7, WARD discloses catalytic compositions containing (a) at least one element selected from the group consisting essentially of Mo, Cu, Ga, In, W, Ta, Zr, Ti (col. 7, line 41), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 5, lines 1-2), and (c) one or more lanthanides (col. 5, lines 20-24).

50. In regard to claim 8, WARD discloses catalytic compositions that essentially consists of (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti (col. 7, line 41), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 5, lines 1-2), and (c) one or more lanthanides (col. 5, lines 20-24).

51. In regard to claim 15, it is noted that WARD incorporates by reference the teachings of Kelley, et. al. (U.S. 4,040,944), hereinafter KELLEY. KELLEY discloses that the catalytic compositions that contain Y-zeolite and rare earths, as taught by

WARD, may also contain Zn (col. 7, lines 43-48) and Mo (col. 7, line 63) as well as polyvalent metal ions such as copper (Cu) (col. 7, lines 43-48).

52. In regard to claim 21, WARD discloses that the lanthanide is lanthanum (col. 5, line 25).

53. In regard to claim 22, WARD discloses that the lanthanide is in the form of an oxide, ion or a mixture of these forms (col. 5, lines 15-16 and col. 6, 1-4). Calcination converts the lanthanide to the corresponding oxide.

54. In regard to claims 23-24 WARD discloses that the lanthanide is in a quantity, expressed as an element, varying from 0.5 to 20% by weight with respect to the total weight of the catalytic composition, and, more specifically, that the lanthanide is in a quantity ranging from 1 to 15% by weight with respect to the total weight of the catalytic composition (col. 5, lines 58-59).

55. Claims 41 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over HASS in view of WARD as evidenced by KELLEY.

56. In regard to claim 41, HASS discloses catalytic compositions comprising: (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, metals of group VIII (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt) (col. 5, lines 1-8), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 4, lines 37-39), with the exclusion of a catalytic composition comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of

the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B. The set of elements useful in the process of HASS are limited to Groups VI, VII, and VIII (col. 5, lines 1-8) and excludes lanthanides. Therefore, HASS excludes catalytic compositions comprising at least one lanthanide, at least one metal belonging to group VIII and a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B.

57. HASS does not appear to explicitly disclose a catalytic composition additionally containing one or more lanthanides.

58. However, WARD discloses catalytic compositions containing one or more lanthanides (col. 5, lines 20-24).

59. Therefore, at the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the catalyst of HASS to include the catalytic composition containing the lanthanides of WARD in order to maintain catalyst activity at high temperature and during catalyst regeneration (WARD, col. 3, lines 49-52).

60. In regard to claim 43, WARD discloses a process for preparing the catalytic composition according to claim 41, which comprises treating the zeolite with a lanthanide compound (col. 5, lines 62-68), treating the product with a compound of the element Me, drying and calcining (col. 7, lines 47-56 and col. 8, lines 17-23).

61. With regard to claim 44, KELLEY, which is incorporated in WARD, by reference, discloses the use of the zeolite in acidic form (KELLEY, col. 7, line 37). Therefore, WARD discloses the process according to claim 43, wherein the lanthanide is inserted

in the zeolite in acidic form by ion exchange (col. 5, line 15), optionally calcining the product thus obtained (col. 7, lines 45-47), depositing the element Me by ion exchange (col. 8, lines 2-6), and drying and calcining the product (col. 7, lines 47-49).

62. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over HASS, in view of WARD.

63. HASS discloses a process for the production of linear alkanes containing less than 6 carbon atoms (col. 1, line 12) which comprise contacting a mixture comprising one or more hydrocarbons containing at least 6 carbon atoms (col. 1, line 13) in presence of hydrogen (col. 1, line 15) with a catalytic composition consisting of (a) at least one element Me selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti, mixed with one or more metals of group VIII (column 5, lines 1-4), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum with Fe, Ga or B (col. 4, lines 37-39).

64. HASS does not appear to explicitly disclose that the catalytic composition consists of one or more lanthanides.

65. However, WARD discloses a catalytic composition useful for hydrocracking processes comprising (a) at least one element selected from the group consisting essentially of Zn, Mo, Cu, Ga, In, W, Ta, Zr, Ti and metals of group VIII (col. 7, lines 38-42), (b) a zeolite selected from Y-zeolite and Y-zeolite modified by partial or total substitution of the Si with Ti or Ge and/or partial or total substitution of the aluminum

with Fe, Ga or B (col. 5, lines 1-4), and (c) one or more lanthanides (col. 5, lines 20-29). at least one lanthanide (col. 5, lines 20-24).

66. Therefore, at the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the process of HASS for producing linear alkanes containing less than 6 carbon atoms to include the catalytic composition containing lanthanides of WARD in order to maintain catalyst activity at high temperature and during catalyst regeneration (WARD, col. 3, lines 49-52).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRADLEY ETHERTON whose telephone number is (571) 270-5478. The examiner can normally be reached on Monday through Friday, 7:30 a.m. to 5:00 p.m. EST, with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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